

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington D.C. 20554

In the matter of: )  
 )  
Amendment of Part 90 of the Commission's Rules )  
to Provide for Flexible Use of the 896-901 and ) WT Docket No. 05-62  
935-940 MHz Bands Allotted to the Business and )  
Industrial Land Transportation Pool )

**REPLY COMMENTS OF MOTOROLA, INC.**

Motorola Inc. ("Motorola") hereby replies to comments submitted in response to the Commission's Notice of Proposed Rule Making in the above-captioned proceeding.<sup>1</sup> Several of the commenting parties expressed concern over the likelihood that incumbent 900 MHz systems would receive interference from new commercial operations similar to that experienced in the 800 MHz band.<sup>2</sup> In these reply comments, Motorola, a leading supplier of 900 MHz radio equipment to the commercial SMR market as well as private wireless business and industrial markets, offers technical information on the performance of its 900 MHz products so that the Commission may better assess the potential for interference to incumbent operations if it adopts the proposals contained in the *NPRM*.

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<sup>1</sup> *Amendment of Part 90 of the Commission's Rules to Provide for Flexible Use of the 896-901 MHz and 935-940 MHz Bands Allotted to the Business and Industrial Land Transportation Pool*, WT Docket No. 05-62, *Notice of Proposed Rule Making*, FCC 05-31 (rel. Feb. 16, 2005) ("*NPRM*").

<sup>2</sup> *See e.g.*, Joint Comments of Association of American Railroads, American Petroleum Institute, MRFAC, Inc., National Association of Manufacturers, United Telecom Council at 14-21 ("*Joint Comments*"); Comments Of South Carolina Public Service Authority at 5-7 ("*SCPSA Comments*"); Comments of the Association of American Railroads at 10-19 ("*AAR Comments*"); Comments of Florida Power & Light Company at 10 ("*FPL Comments*"). All comments are dated May 18, 2005, and submitted in WT Docket No. 05-62 unless otherwise noted.

One of the issues under consideration in this proceeding is whether the potential for interference in the 900 MHz band is comparable to that of the 800 MHz band. Motorola is not taking a position on the best approach to protecting incumbents. In general, however, there are no technical differences between these two bands that would significantly impact the potential for interference. The 900 MHz band, allocated for private wireless and commercial uses, shares many similarities with the 800 MHz band with some relatively minor differences. Channels in the 900 MHz band are 12.5 kHz wide as opposed to 25 kHz in the 800 MHz band. This does create some minimal additional degradation in interference protection due to the reduced separation between channels.<sup>3</sup> The propagation characteristics of the two bands are very similar and account for less than 1 dB difference.

The original 900 MHz channelization plan provides alternating allotments for Business, Industrial/Land Transportation (“B/ILT”) and SMR use and therefore provided some separation between private and commercial systems. However, the 800 MHz Report and Order allowed B/ILT licensees in the 900 MHz band to convert or assign their licenses to support commercial operations.<sup>4</sup> This creates the opportunity for interleaving channels with mixed “high-site” B/ILT systems and “low-site” commercial systems in a fashion similar to the 800 MHz band’s General Category pool of channels and interleaved spectrum segments prior to rebanding. As Motorola

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<sup>3</sup> See, e.g., TIA Telecommunications Systems Bulletin: Wireless Communications Systems – Performance In Noise And Interference Limited Situations; Recommended Methods For Technology Independent Modeling, Simulation, and Verification TSB-88-B, (September 2004) at Appendix A.

<sup>4</sup> See Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order, WT Docket No. 02-55, 19 FCC Rcd 14969 at ¶ 337 (2004).

has previously noted,<sup>5</sup> when private wireless radios operating from a high-power, high base site system move into a weak desired signal environment but within the immediate vicinity of an undesired low-power cellular transmitter, the potential exists for the private wireless radios to be overpowered and experience interference.<sup>6</sup> Greater interleaving of high-site private wireless and low-site commercial systems increases the number of band edges between adjacent channels and thus increases interference possibilities. This potential would be reduced if channels for low site deployments were consolidated in a way that minimizes the interleaving of high-site and low-site operations.

In its comments, AAR stated that its analysis shows that 900 MHz equipment is more susceptible to interference than equipment used at 800 MHz.<sup>7</sup> More specifically, AAR indicated that it performed a “comparative analysis of the adjacent channel rejection and intermodulation rejection performance of generic mobile radios manufactured for use in both the 800 MHz and 900 MHz bands” and found that the radios do not achieve the same rejection performance at 900 MHz of which they are capable at 800 MHz.<sup>8</sup> AAR noted that it submitted this same information in the FCC’s proceeding dealing with the resolution of 800 MHz interference.<sup>9</sup>

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<sup>5</sup> See, e.g., Letter from Steve B. Sharkey, Director, Spectrum and Standards Strategy, Motorola, Inc. to James D. Schlichting, Deputy Chief, Office of Engineering and Technology, FCC, WT Docket No. 02-55 (June 20, 2003).

<sup>6</sup> While the “near-far” scenario increases the probability of interference, it does not guarantee that interference will occur. Whether or not interference will occur will depend on the specific implementation at each site and the surrounding conditions.

<sup>7</sup> AAR Comments at n. 26.

<sup>8</sup> Id.

<sup>9</sup> See Petition for Reconsideration filed by the Association of American Railroads, WT Docket No. 02-55, December 17, 2004, at n. 18.

In response to AAR's observations, Motorola provides the attached spreadsheet that details the adjacent channel rejection (ACR) and intermodulation rejection (IMR) performance characteristics of our current product line for the 900 MHz band.<sup>10</sup> Note that this same information is publicly available on Motorola's web site.<sup>11</sup>

The data shows that AAR is correct in its general conclusion that the ACR and IMR performance characteristics of 900 MHz radios lags behind 800 radios, at least based on the performance of Motorola's radios. The principal reason for this difference is that the 900 MHz radios are based on non-public safety user requirements and the accommodation of 12.5 kHz channel spacing. Motorola is further evaluating the technical issues of this proposal by the FCC for greater flexibility in the 900 MHz band. We will continue to share our findings with the Commission and all parties involved and affected by this proceeding.

Respectfully Submitted,

/s/ Steve B. Sharkey

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<sup>10</sup> For reference, the relevant specifications from the TIA standards are also included.

<sup>11</sup> See, e.g., [http://www.motorola.com/governmentandenterprise/northamerica/en-us/public/functions/viewdownload/vdshowrelatedfiles.aspx?navigationpath=lvlzviewdownload/id\\_353i](http://www.motorola.com/governmentandenterprise/northamerica/en-us/public/functions/viewdownload/vdshowrelatedfiles.aspx?navigationpath=lvlzviewdownload/id_353i).

## APPENDIX A

### 800 MHz vs 900 MHz Receiver Specification Comparison

Applicable Standards for Analog Radios reference paragraph				Channel Spacing  (kHz)	Sensitivity analog = 12 dB SINAD digital = 5% BER (μV) (dBm) 3.1.4.2		Adjacent Channel Rejection  (dB) 3.1.6.2	Intermod Rejection  (dB) 3.1.9.2	Spurious & Image Rejection  (dB) 3.1.8.2
TIA-603-C-2004	Class A	Mobile		25	0.35	-116.0	75	75	75
TIA-603-C-2004	Class B	Mobile		25	0.50	-113.0	70	70	70
TIA-603-C-2004	Class A	Portable		25	0.35	-116.0	70	70	70
TIA-603-C-2004	Class B	Portable		25	0.50	-113.0	60	50	60
TIA-603-C-2004	Class A	Mobile		12.5	0.35	-116.0	45	75	75
TIA-603-C-2004	Class B	Mobile		12.5	0.50	-113.0	40	70	70
TIA-603-C-2004	Class A	Portable		12.5	0.35	-116.0	45	70	70
TIA-603-C-2004	Class B	Portable		12.5	0.50	-113.0	40	50	60

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Vendor	Model	Mob/Port	Band	Channel Spacing  (kHz)	Sensitivity analog = 12 dB SINAD digital = 5% BER (μV) (dBm)		Adjacent Channel Rejection  (dB)	Intermod Rejection  (dB)	Spurious & Image Rejection  (dB)
Motorola	MTS2000	Portable	800 MHz	25	0.28	-118.0	72	72	78
Motorola	MTS2000	Portable	900 MHz	12.5	0.28	-118.0	63	62	69
Motorola	MCS2000	Mobile	800 MHz	25	0.30	-117.4	80	80	90
Motorola	MCS2000	Mobile	900 MHz	12.5	0.30	-117.4	70	65	90
Motorola	LTS2000	Portable	800 MHz	25	0.35	-116.1	65	65	65
Motorola	LTS2000	Portable	900 MHz	12.5	0.35	-116.1	60	60	60

Vendor	Model	Mob/Port	Band	Channel	Sensitivity		Adjacent Channel Rejection	Intermod Rejection	Spurious & Image Rejection
				Spacing	analog = 12 dB SINAD				
						digital = 5% BER			
				(kHz)	(μV)	(dBm)	(dB)	(dB)	(dB)
Motorola	LCS2000	Mobile	800 MHz	25	0.35	-116.1	65	65	65
Motorola	LCS2000	Mobile	900 MHz	12.5	0.35	-116.1	65	60	65
Motorola	MTX850/MTX8250	Portable	800 MHz	25	0.35	-116.1	70	70	70
Motorola	MTX950/MTX9250	Portable	900 MHz	12.5	0.35	-116.1	60	65	70
Motorola	GTX-LTR	Mobile	800 MHz	25	0.35	-116.1	65	65	65
Motorola	GTX-LTR	Mobile	900 MHz	12.5	0.35	-116.1	65	60	65
Private iDEN (digital)									
Motorola	R750	Portable	800 MHz	25	0.63	-111.0	60	45	60 (Image =55)
Motorola	R750	Portable	900 MHz	25	0.63	-111.0	60	45	60 (Image =55)
@ 10% BER									